



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

D3391-021
Job Sheet 168941-A



Part No: D3391-021

Job Qty: 1 ea

Part Name: Fwd Tube Assembly



Part Weight: 0 lbs

Status: Scheduled

Priority: Medium

Job Created: 11/27/17

Job Tracking No:

Due Date: 12/8/17

Created By: Marie Lajeunesse

Type: Stock

Description:

Note: DWG REV J SHEETS 4,5 IPP A 05.09.13 New issue KJ/JLM IPP B IPP C IPP D 07.03.13 rev F dwg EC IPP E 07.11.07 revG dwg ecn1053P EC verified by: DD IPP Rev:f ECN 1056 07-11-12 DD verified by: EC IPP Rev:G 08-09-08 new process (ecn 08-510) DD verified by:EC IPP Rev:H 08-09-10 revH as per dwg DD verified by:EC IPP Rev I 09.02.02 added hardware EC verified by: DD IPP Rev:J 11.11.14 AS PER REV.I DD verified by:JLM

Ship Via:

Bill of Materials

Job Routing

Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup hrs	Run Hrs	Workcenter / Supplier	Lead Time	
90	Start up Operation	1 Ea	12/7/17	12/7/17	0.00	0.00	Start Up Skidtubes		
100	Skidtubes	1 pcs	12/7/17	12/7/17	0.00	0.82	Skidtubes		<i>MBG</i>
110	CNC Bend Skidtubes	1 pcs	12/7/17	12/7/17	0.00	1.00	CNC Bend Skidtube		<i>MBG</i>
120	QC	1 pcs	12/7/17	12/7/17	0.00	0.00	QC5		<i>BE</i>
130	CNC Vertical Machining	1 pcs	12/7/17	12/7/17	2.21	1.00	HAAS 1		<i>Kt - 17-12-08</i>
140	QC	1 pcs	12/7/17	12/7/17	0.00	0.00	QC2		<i>Kt - 17-12-08</i>
150	Mill Conv	1 pcs	12/7/17	12/7/17	0.00	0.27	Mill Conv 1		<i>J.C.L. 17-12-11</i>
160	QC	1 pcs	12/7/17	12/7/17	0.00	0.00	QC2		<i>J.C.L. 17-12-11</i>
170	QC	1 pcs	12/7/17	12/7/17	0.00	0.00	QC8		<i>PAK 17/12/11</i>
180	Skidtubes	1 pcs	12/7/17	12/7/17	0.00	0.82	Skidtubes		<i>AP 2017/12/14</i>
190	QC	1 pcs	12/7/17	12/7/17	0.00	0.00	QC5		<i>PAK 17-12-15</i>
200	HandFinish	1 pcs	12/7/17	12/7/17	0.00	0.33	HandFinish1		<i>BE 17/12/16</i>
210	QC	1 pcs	12/7/17	12/7/17	0.00	0.00	QC7		<i>PAK 17-12-21</i>
220	Skidtubes	1 pcs	12/7/17	12/7/17	0.00	0.82	Skidtubes		<i>AP 2017/12/20</i>
230	QC	1 pcs	12/7/17	12/7/17	0.00	0.00	QC5		<i>PAK 17-12-21</i>
235	HandFinish	1 pcs	12/7/17	12/7/17	0.00	0.33	HandFinish2		<i>2017-12-21/PAK</i>
241	Spray Paint	1 pcs	12/7/17	12/7/17	0.00	0.99	Spray Paint		<i>PO 038670</i>
250	QC	1 pcs	12/7/17	12/7/17	0.00	0.00	QC14		<i>17-12-20</i>
254	HandFinish	1 pcs	12/8/17	12/8/17	0.00	0.33	HandFinish4		
256	QC	1 pcs	12/8/17	12/8/17	0.00	0.00	QC5		
260	Packaging	1 pcs	12/8/17	12/8/17	0.00	0.00	Packaging3		
280	QC21-SA	1 Ea	12/8/17	12/8/17	0.00	0.00	QC21		

Part Op 100 - Cut as per dwg.

Descriptions: 110 - Bend as per Dwg D3391 Using Bend Prog 3391021

130 - 1-Machine as per Folio FA590 Rev. ____ & Dwg D3391 Rev. ____

150 - Drill X1 Aft cap as per Dwg D3391 .1875" dia

180 - 1-Drill Remaining two holes for tow cap using DT 8819 Locating off of .1875" holes drilled in previous step 2-Drill float bag holes as per Dwg D3391 using DT8798(Do not open tow cap holes to finish size) (ONLY DRILL HOLES MARKED "A") 6-Deburr & Scribe Batch number Inside aft end. 7-Transfer drill D3391-021 with D3391-023

220 - 1-instal spacers as per dwg D3391 A/R Magnabond 6398 batch: M137712 exp. date: 2018/01 cure time 12hrs. as per QSI015 2- grind crossbolt flush 3-back drill crossbolt if necessary

235 - AND REALODINE AS PER QSI 005

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order: _____	DISPOSITION ☐ Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved	Skid-to
Part No. _____		Machin
NCR No. _____		Thermoform
Date : _____		Large I
Step #: _____		QTY Ef

Description Work Order Deviation

Root Cause	
☐ Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified	☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due
☐ Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter	☐ Temperature/ ☐ Set-up ☐ BOM/Route ☐ Broken/Dam: ☐ Inspection In ☐ Contaminatic ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes
OTHER : _____	

PART NO:
Revision:
Operation:
Change No:

Start up Operation

Mfg Date: 12/05/17
Job No: 168941 - A



Fwd Tube Assembly

S017271



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Hawkesbury, ON K6A 1K7
CANADA
TEL: 1 613 632 - 5200
Email: sales@dartaero.com
www.dartaerospace.com

ing	li	er	Approval
ed By	Supervisor	ification	ordinator
val	Wrong	imensions	ler tolerance
rect	'Missing	ed	Drawing
Finish	Misread	Turning Sequence	

Job Allocations

Operation	Component Part	Required	Inventory	Allocated	Std Qty
90-Start up Operation	D6013-047 <i>B86064</i>	1	63	0	0
220-Skidtubes	D3670-4-200 <i>B165393</i>	4	78	0	0
254-HandFinish <i>F11135948-2</i>	AELS-1032-225	10	0	0	0
	AN3C4A <i>5000533</i>	10	993	0	0
	D3401-041 <i>F155540</i>	1	11	0	0
	D3672-1 <i>F160074</i>	4	1,741	0	0
<i>M159902-127</i>	D4095-051	1	40	0	0
	NAS1149C0332R	10	3,161	0	0
	<i>F11138405-1</i>				

Part Specifications

Specifications could not be found.

Plex 11/27/17 11:26 AM Dart.lajeunesse.marie

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
OTHER : ☐					

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Mislabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
OTHER : ☐					

INSTALL D3670-4200 SPACER
SEAL WITH MAGNOBOND 6398
GRIND FLUSH
PRIOR TO PAINTING
4 PL

DETAIL B



D4095-051
WEARSHOE

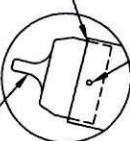
INSTALL
AELS-1032-225
AFTER FINISH
10 PL

AN3C4A BOLT
NAS1149C0332R WASHER
6 PL

D3391-021 FWD TUBE ASSEMBLY ASSEMBLY DETAIL

SEAL WITH
SIKAFLEX-241/-291

D3401-041
TOW CAP

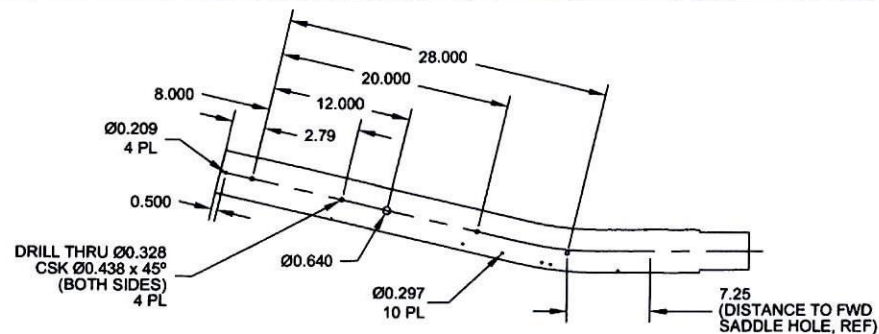


AN3C4A BOLT
D3672-1 WASHER
NAS1149C0332R WASHER
4 PL

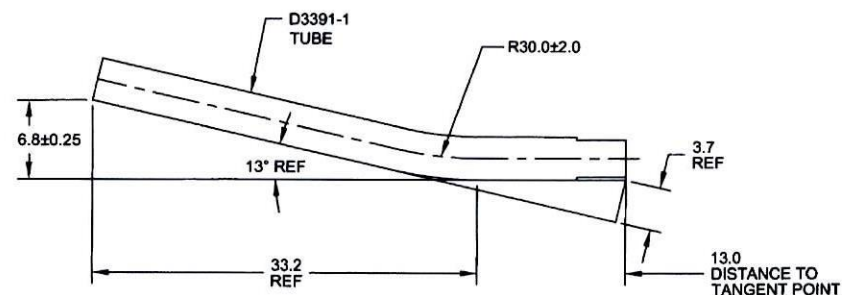
DETAIL B SCALE 2X

D3391-021 FWD TUBE ASSEMBLY PARTS LIST

QTY	PART NUMBER	DESCRIPTION
X	D3391-021	FWD TUBE ASSEMBLY
1	D3391-1	TUBE
1	D3401-041	TOW CAP
4	D3670-4200	SPACER
4	D3672-1	WASHER
1	D4095-051	WEARSHOE
10	AELS-1032-225	INSERT
10	AN3C4A	BOLT
10	NAS1149C0332R	WASHER



D3391-021 DRILLING DETAIL



D3391-021 BENDING DETAIL (MAKE FROM D3391-1)

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 168941-A

RELEASED
2016-04-28

DESIGN	PH	DART AEROSPACE USA, INC	
DRAWN	ML	EUGENE, OR	
CHECKED	CP	DRAWING NO.	REV. J
MFG. APPR.	DR	D3391	SHEET 4 OF 11
APPROVED	CP	TITLE	SCALE
DE APPR.	CP	412 FLOAT SKIDTUBE	NTS
DATE	16.01.14	COPYRIGHT © 2005 BY DART AEROSPACE USA, INC	
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DQA: _____ Date: _____

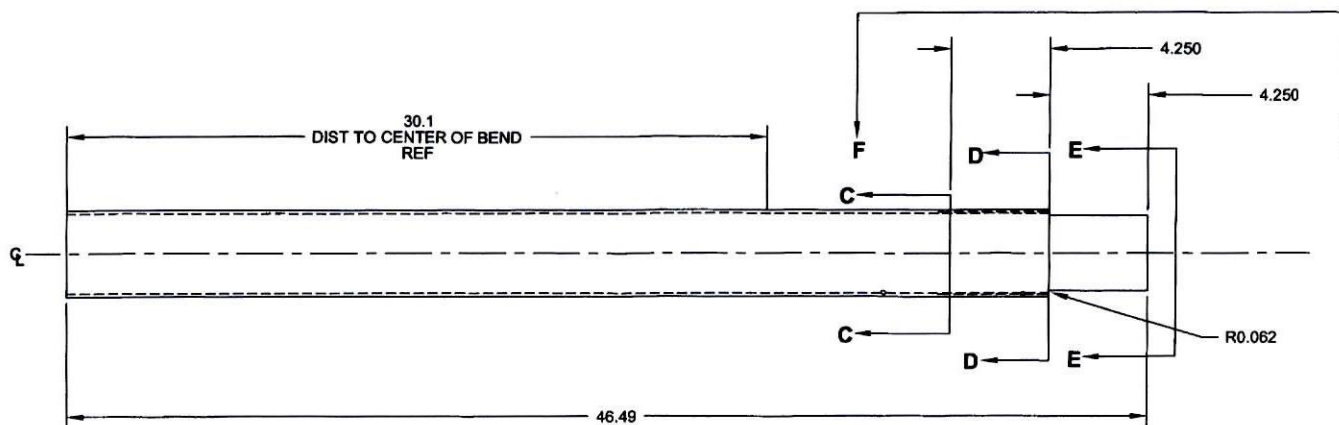


WORK ORDER NON-CONFORMANCE / UPDATE

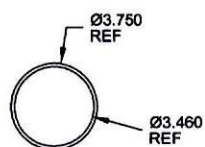
QA Closed: _____ Date: _____

Work Order update only ☐

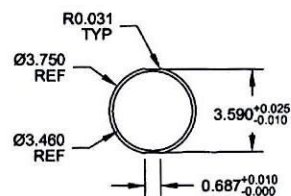
Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval Completed By Lead hand / Supervisor Approval Verification QC / QA Coordinator Approval		
Description Work Order Deviation				Disposition					
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____							
Misidentified ☐	Past Due ☐								



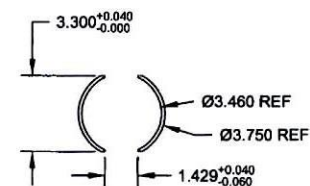
D3391-1 TUBE
(MAKE FROM D6013-047 SKIDTUBE MATERIAL)



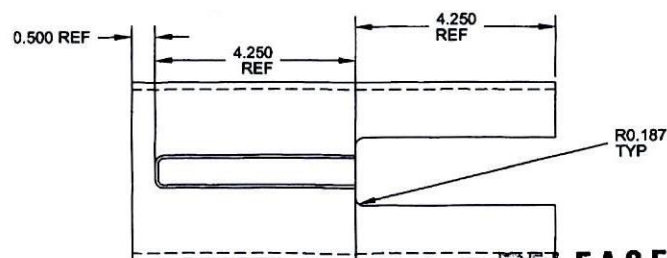
SECTION C-C



SECTION D-D



SECTION E-E



VIEW F-F
SCALE 2X

RELEASED
2016-04-28

DESIGN	PH	DART AEROSPACE USA, INC	
DRAWN	ML	EUGENE, OR	
CHECKED	CP	DRAWING NO.	REV.
MFG. APPR.	22	D3391	SHEET 5 OF 11
APPROVED	22	TITLE	SCALE
DE APPR.	22	412 FLOAT SKIDTUBE	NT
DATE	16.01.14	COPYRIGHT © 2005 BY DART AEROSPACE USA, INC THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR DISSEMINATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE USA, INC	

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

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Work Order update only ☐

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Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER :							
Misidentified ☐	Past Due ☐								